

Limited Progress on the RunIIB Beta* @ D0

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Improvements

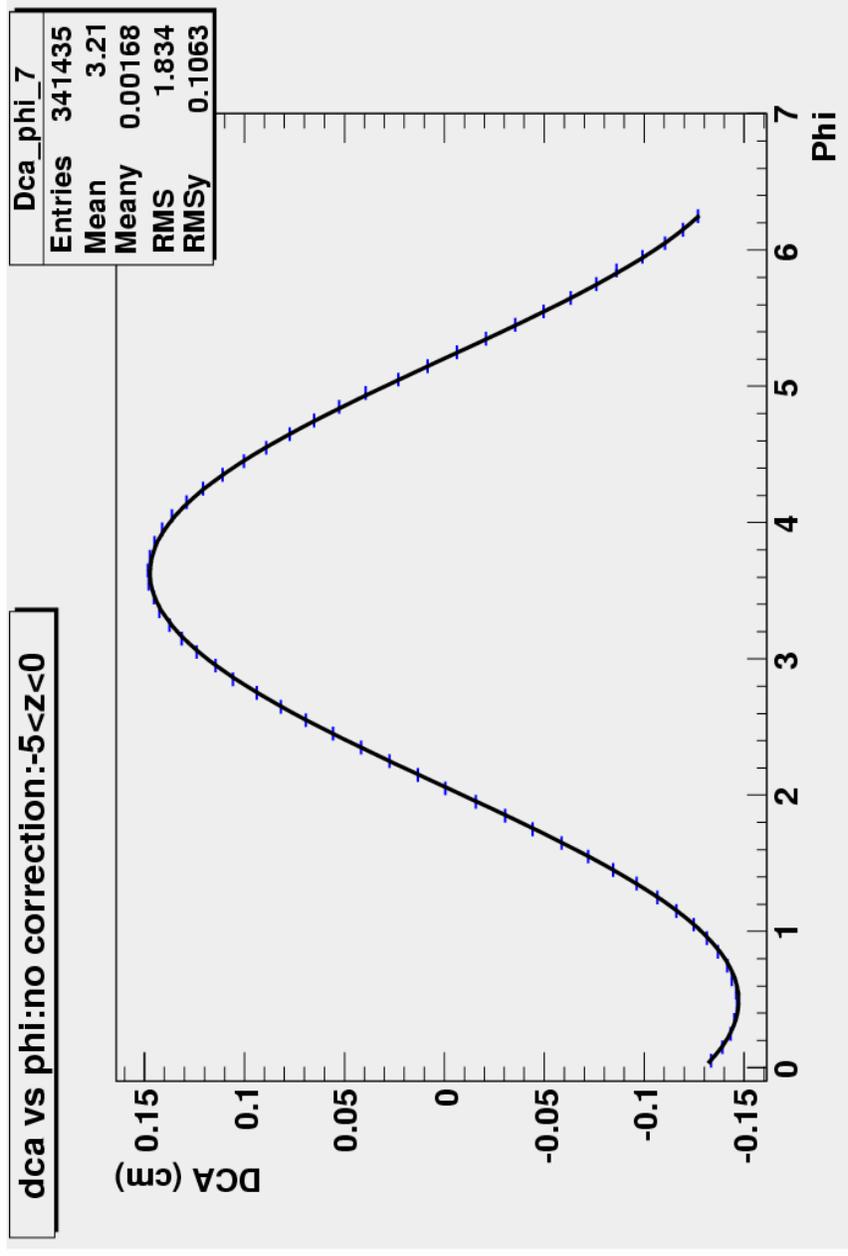
- **Hardware (shutdown)**
 - Added Layer0
 - Replaced L1 calorimeter trigger hardware
 - Increased lookup table size for track trigger
Full granularity / less fake tracks
- **Software**
 - Accommodate hardware changes
 - Updated the beta* software to use the DZero
Common Analysis Format tools

Beta* measurement at D0

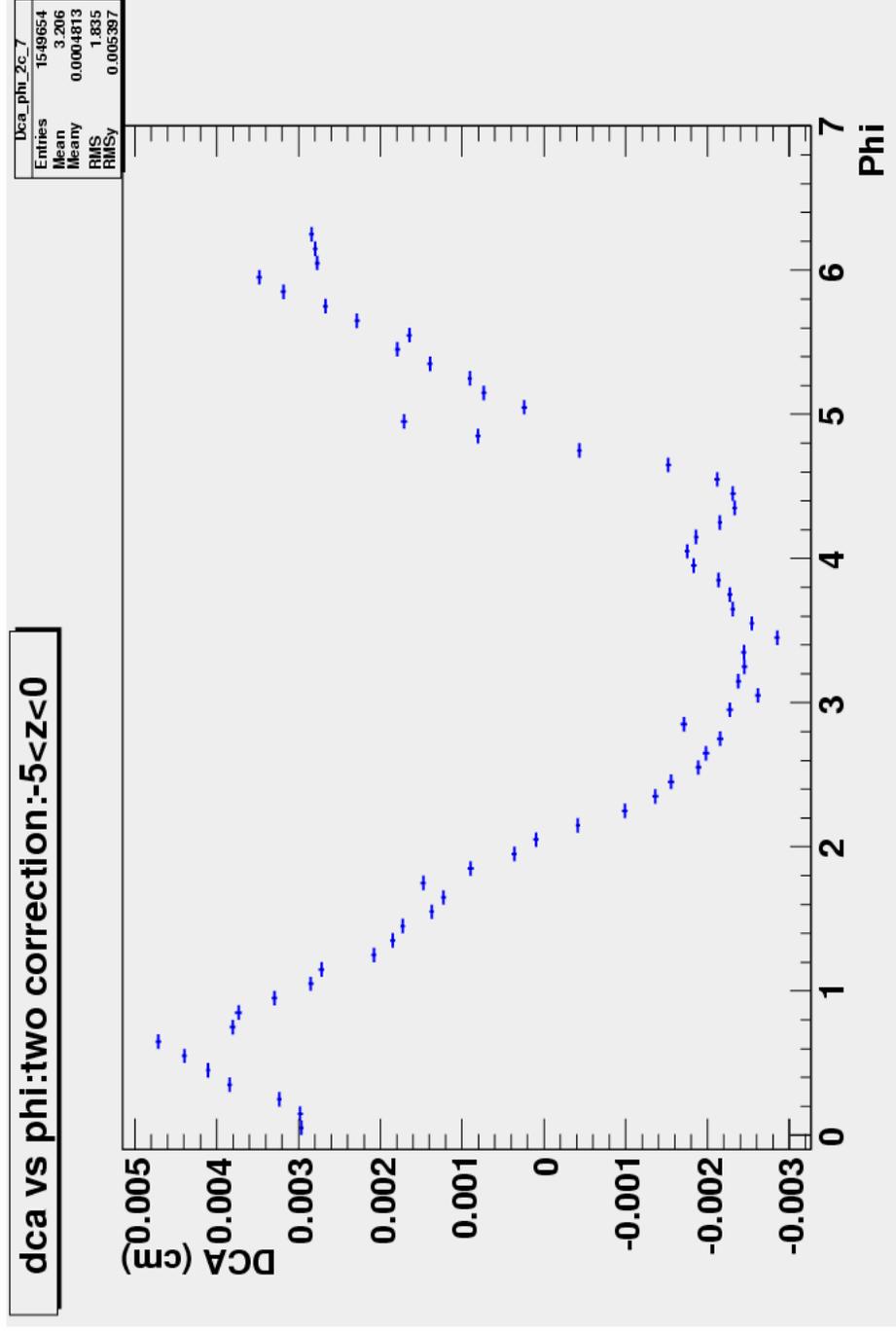
- (1) $D = y \cos(\phi) - x \sin(\phi)$
- (2) $\text{cov}(D_1, D_2) = \frac{1}{2}(\sigma_x^2 - \sigma_y^2) \cos\left(\frac{1}{2}(\phi_1 + \phi_2)\right) + \frac{1}{2}(\sigma_x^2 + \sigma_y^2) \cos(\phi_1 - \phi_2) - \sigma_x^2 \sigma_y^2 \sin\left(\frac{1}{2}(\phi_1 + \phi_2)\right)$
- (3) $\text{cov}(D_1, D_2) = \langle D_1 D_2 \rangle =$
 $= \text{cov}(d_1 + e_1, d_2 + e_2) = \langle d_1 d_2 \rangle + \langle d_1 e_2 \rangle + \langle d_2 e_1 \rangle + \langle e_1 e_2 \rangle =$
 $= \langle d_1 d_2 \rangle$
- (4) $\text{cov}(x, y) = \langle xy \rangle - \langle x \rangle \langle y \rangle$
- (5) $\langle x \rangle = 0$
- (6) $\langle y \rangle = 0$
- (7) $\langle d_i e_j \rangle = \overset{\text{cov}(d_i, e_j)=0}{=} \langle d_i \rangle \langle e_j \rangle = 0$
- (8) $\langle e_i e_j \rangle = \overset{\text{cov}(e_i, e_j)=0}{=} \langle e_i \rangle \langle e_j \rangle = 0$

Store 4802

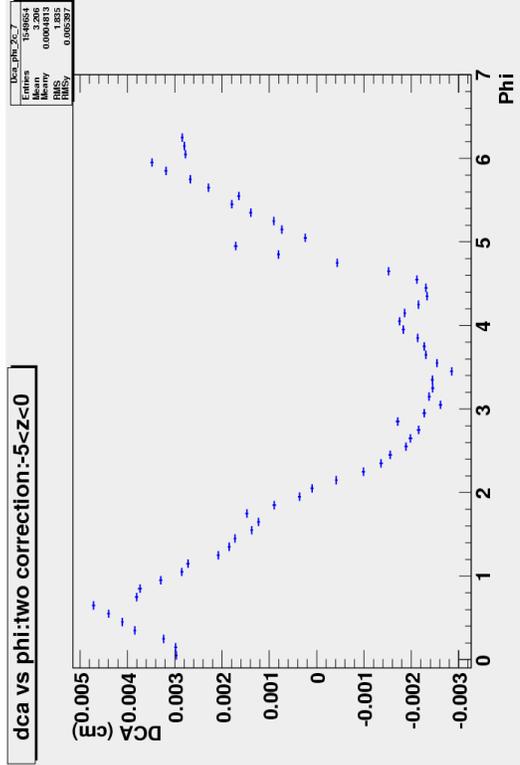
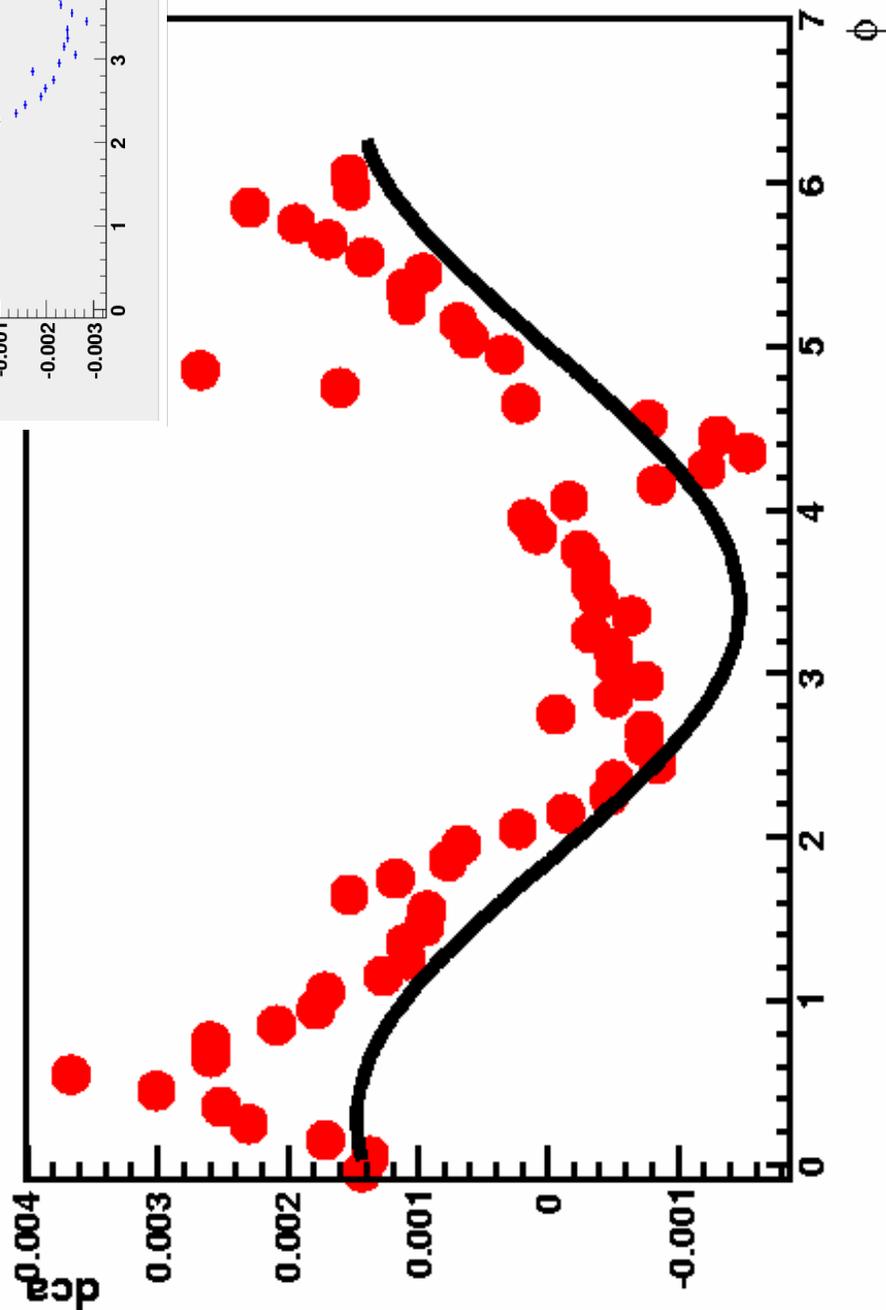
(June 27th, run 222653 ~4h into the store)



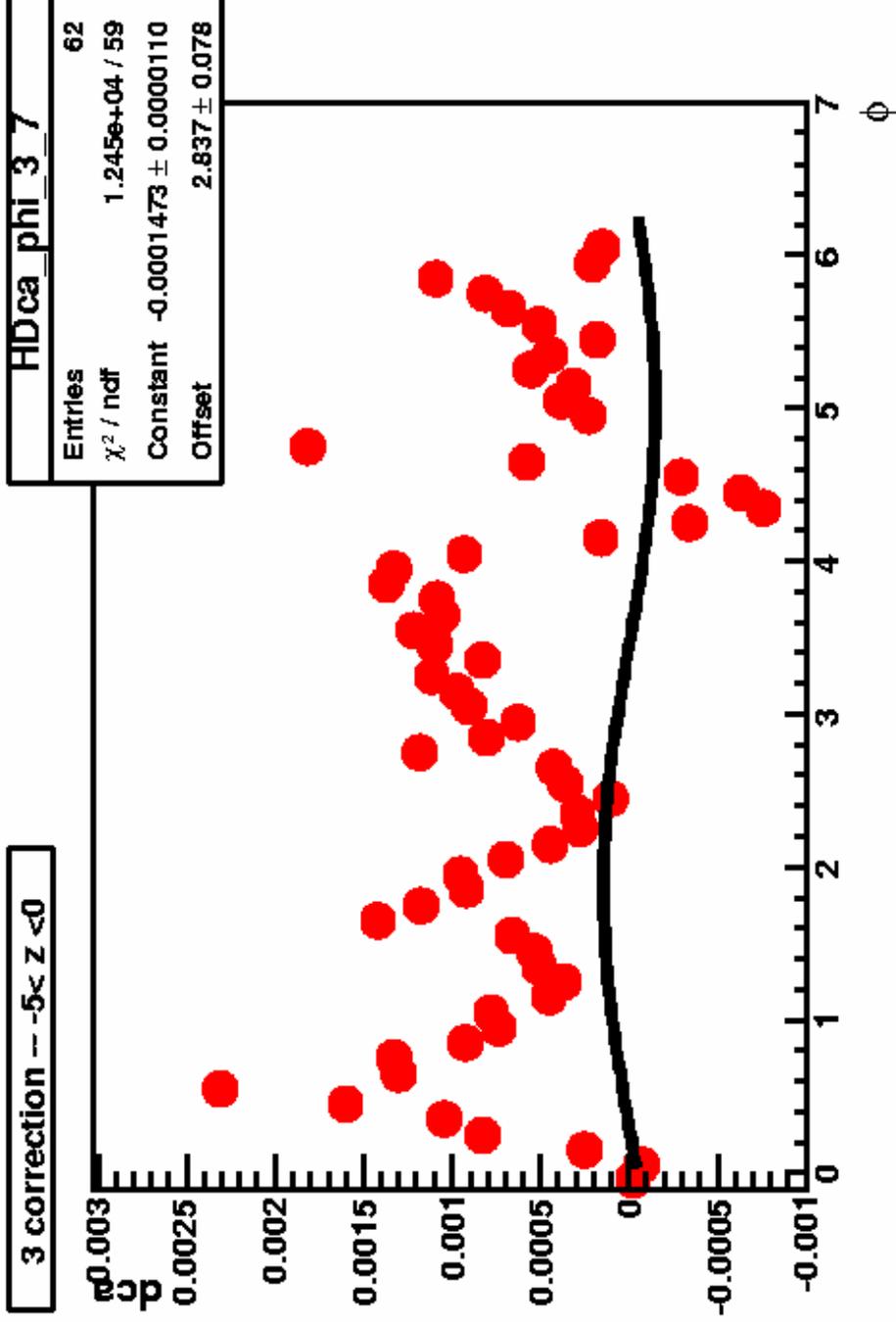
After correction for beam position



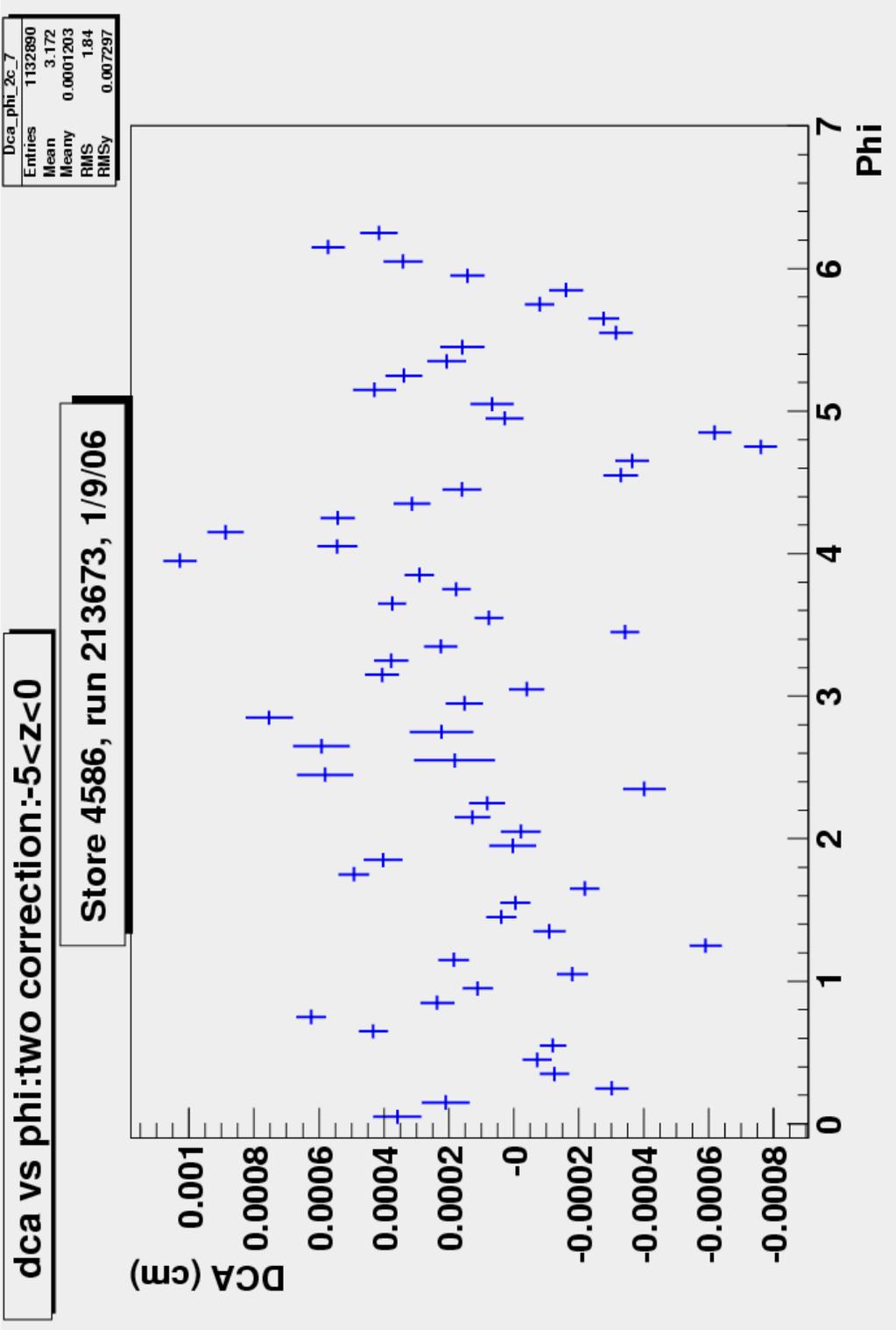
2 correction -- $-5 < Z < 0$



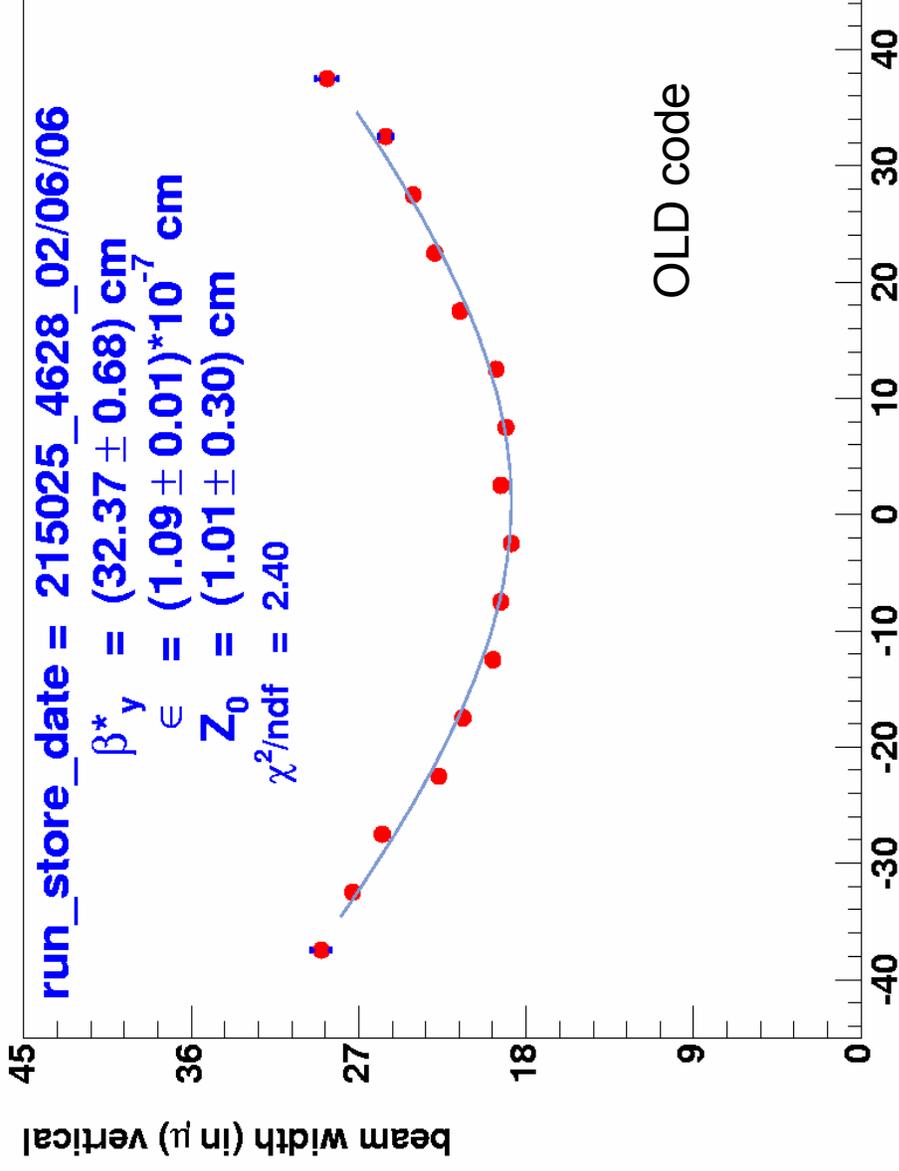
After additional correction

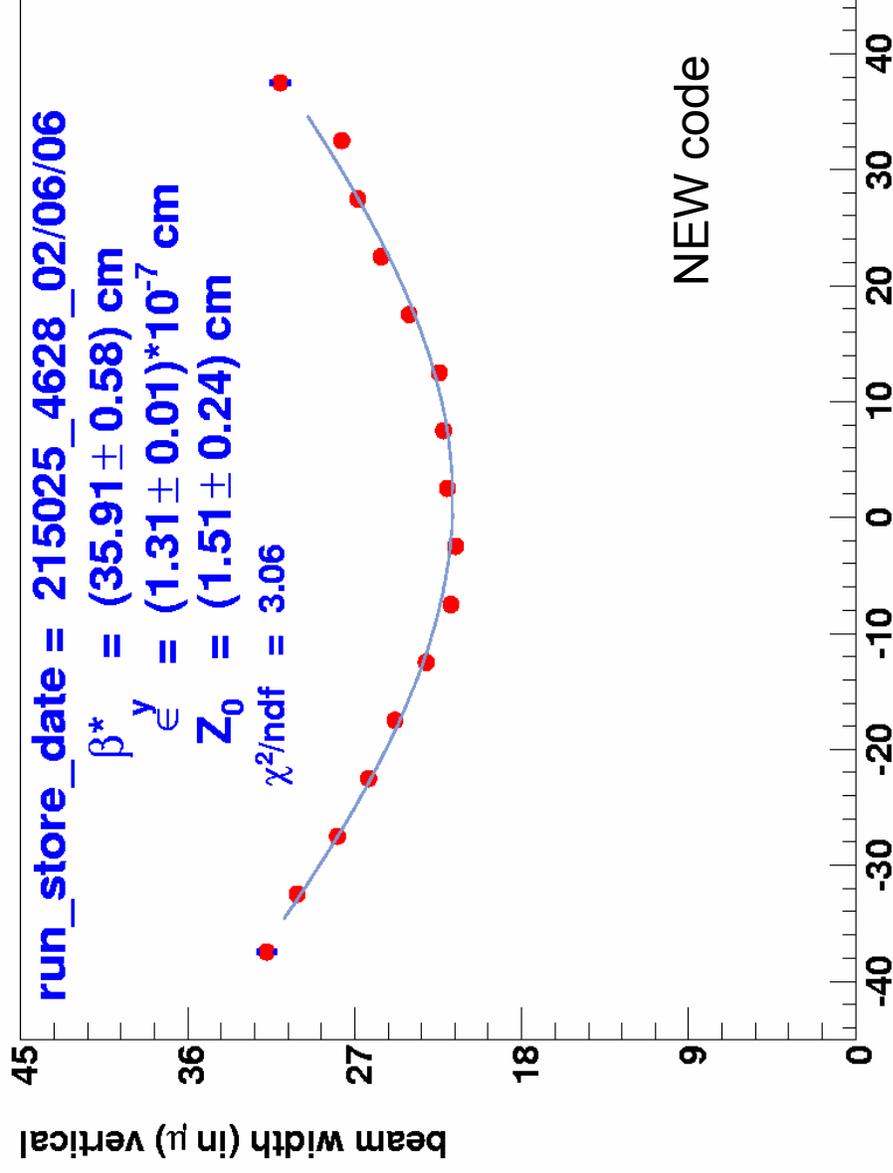


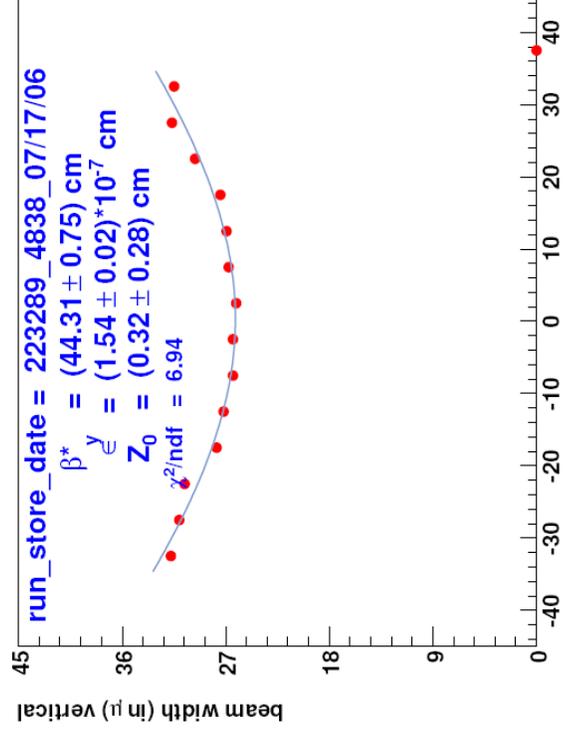
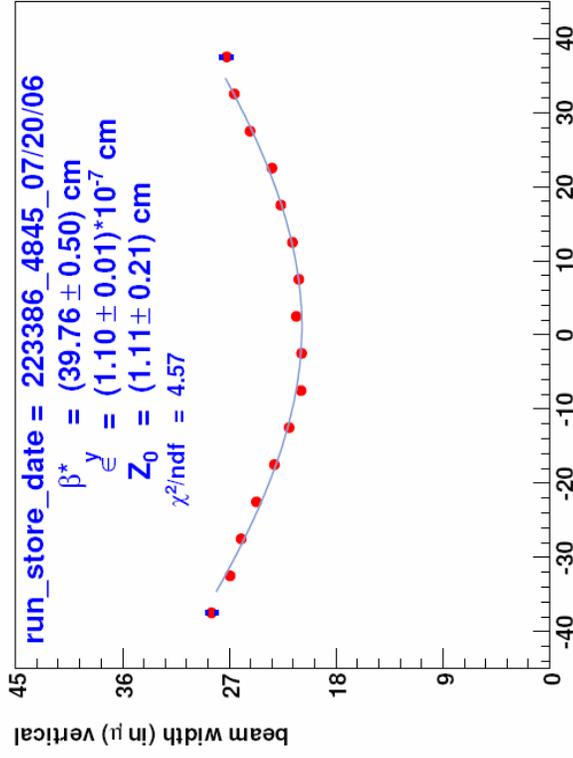
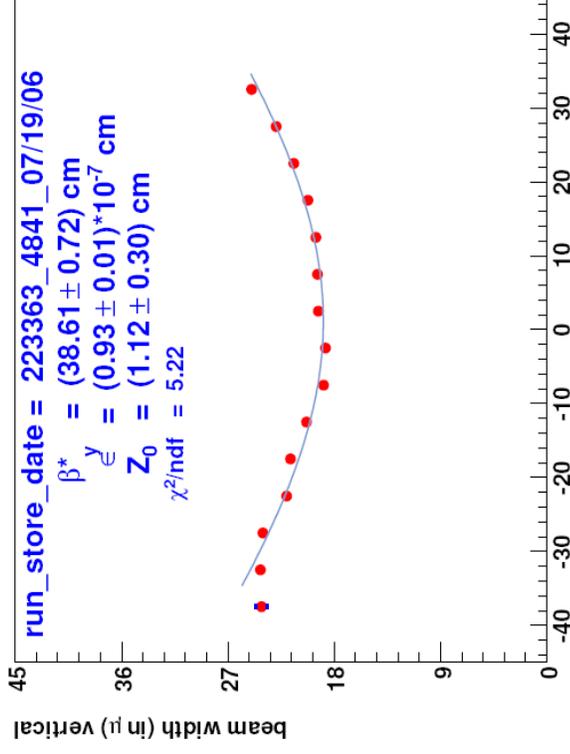
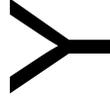
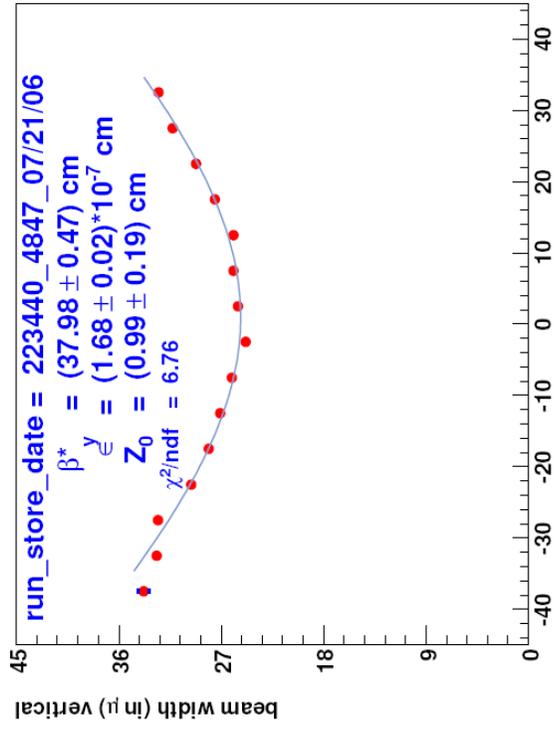
Final corrections pre-shutdown



Code check: same run with old/new software



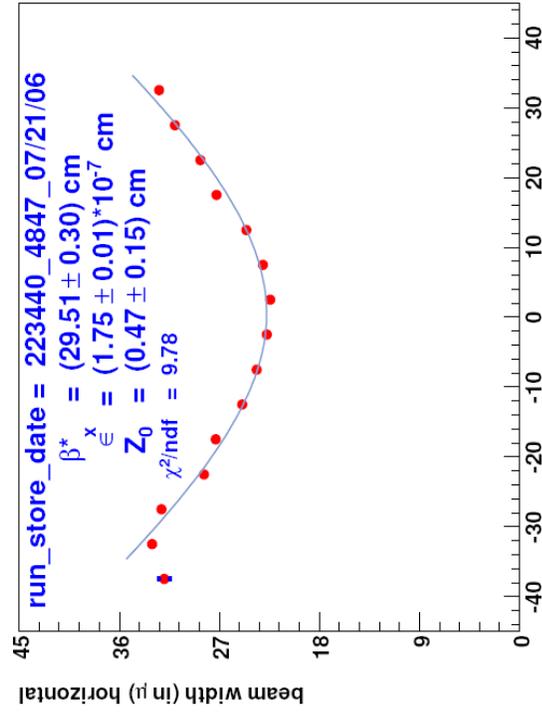




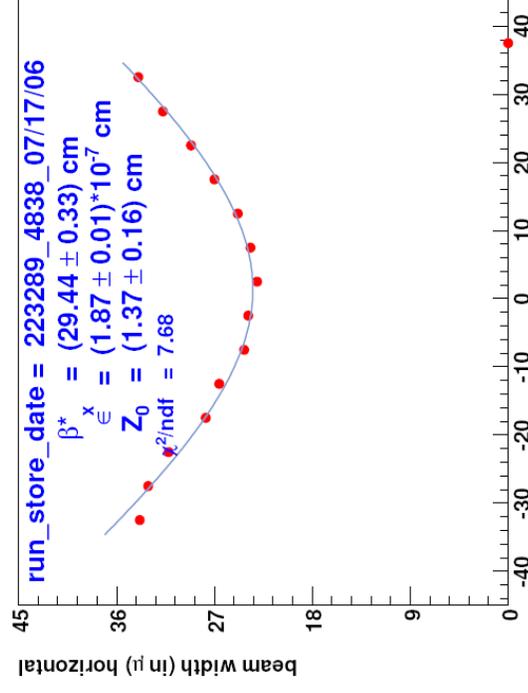
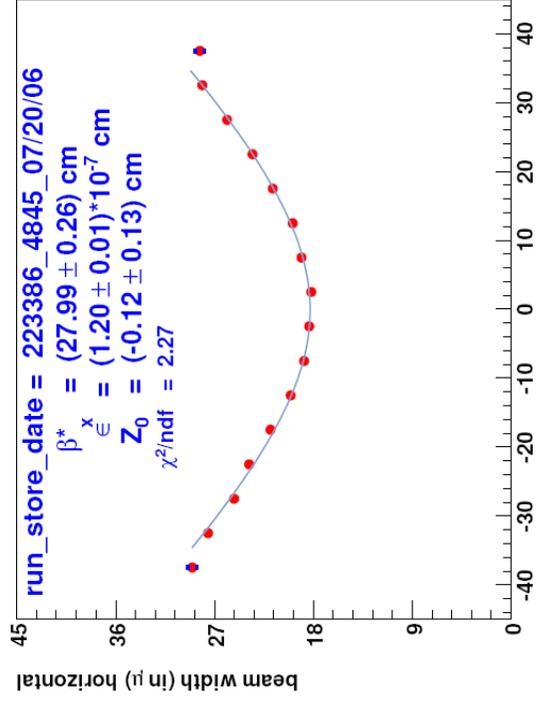
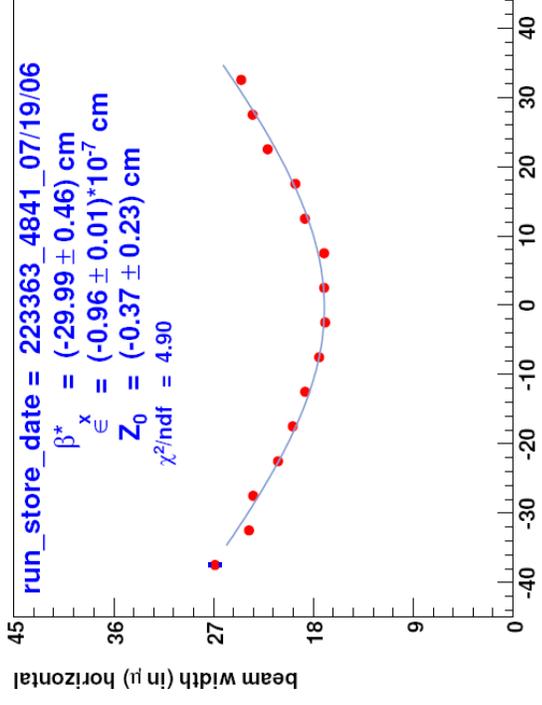
Horizontal axis is cm

DZero beta*

lumi task force 9/20/06



X



Horizontal axis is cm

DZero beta*

lumi task force 9/20/06

Limited progress

- Corrections for beam position are important. Multiple iterations needed.
- A cross check for the new code done: looks OK, but we see some differences